

Applicants: INOUE et al.  
Serial No.: 09/473,988

Docket No.: 991493  
Group Art Unit: 2814

### REMARKS

Claims 1-9 and 11-20 are pending. Applicants propose amendment of claims 1 and 8. A marked-up version showing the proposed changes to claims 1 and 8 is attached hereto as "VERSION WITH MARKINGS TO SHOW CHANGES MADE." Entry of the amendments after final rejection is earnestly solicited.

Claim 1 was objected to due to an informality which is corrected by the above-proposed amendment.

Claims 1-9 and 20 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Favorable reconsideration of this rejection is earnestly solicited in view of the amendments proposed herein. More specifically, the proposed amendments of claims 1 and 8 clarify that the first insulating layer has been formed to cover said conductive film with a third insulating layer being interposed therebetween.

Claims 2, 7 and 9 were further considered indefinite in regard to the phrase "a threshold." The meaning of "threshold" had been discussed in detail in response to the first Office Action. Furthermore, the specification defines the meaning of "threshold" beginning at page 17, line 19 and illustrated in Fig. 5.

As shown in Fig. 5, in a relation between the SiH content and the number of bubble defects, there is an SiH content (around 50%) at which the number of bubble defects abruptly decreases by an increase in the SiH content. This SiH content is indicated in a broken line and the concerned SiH content is defined as "threshold". As clearly stated in the specification, the bubble defects are hollow etching defects and this phenomenon is caused by the degassing from

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the insulation layer. Since the relation between the SiH content and the number of the bubble defects is almost the same as the relationship between the SiH content and the degassing amount, such description of claims 2, 7 and 9 is made.

Claims 1, 2 and 9 were rejected under 35 U.S.C. §102(e) as being anticipated by *Shields* (U.S. Patent No. 5,958,798). This rejection is respectfully traversed.

The Examiner refers to Fig. 5 of *Shields* as disclosing an insulating layer 52 formed on a conductive film 59. The Examiner also states that an insulating layer 52 has a SiH content of 70%-90%. The above amendment of claim 1 clarifies the feature that a first insulating film covers a conductive film with a third insulating layer being interposed therebetween. This feature is not disclosed or suggested in Fig. 5 of *Shields*.

With respect to claims 2 and 9, *Shields* does not disclose or suggest that the SiH content is defined by "threshold".

Claim 3 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Shields*.  
Favorable reconsideration is earnestly solicited.

Claim 3 sets forth that a second insulating layer has a multilayer structure made up from layers of the same material. It is clearly stated in the specification that even if line defects occur, their spread or expansion is prevented by this structure. In the second insulating layer of the present invention, each layer which constitutes the second insulating layer is formed separately from another layer so that an interface is formed between the layers. This is the most remarkable difference from a single insulating layer (an insulating layer that has the same thickness as the second insulating layer, but has only a single layer structure). In the second insulating layer, any

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line defect having occurred in each layer is interrupted by each interface, so that no line defect extending over neighboring layers occurs. Accordingly, unlike the single layer, the spread or expansion of line defects is thus prevented.

*Shields* does not disclose or suggest a multi-layer structure as set forth in claim 3. Since *Shields* fails to recognize the problem which is solved by the features of claim 3, *Shields* provides no suggestion of the advantages associated with the multi-layer structure.

The Office Action sets forth three additional separate rejections of the claims under 35 U.S.C. §103(a). More specifically, claims 4 and 5 were rejected over *Shields* in view of *Brennan* (U.S. Patent No. 5,998,297), claims 7, 8 and 20 were rejected over *Shields* in view of *Wollesen* (U.S. Patent No. 5,900,668), and claim 6 was rejected over *Shields* in view of *Brennan*, and further in view of *Yu* (U.S. Patent No. 6,069,383). Favorable reconsideration of these rejections is earnestly solicited.

The teachings of the secondary references relied upon in these rejections fail to provide the teachings which the primary reference to *Shields* lacks, as discussed above.

For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

Should the Examiner deem that any further action by Applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone Applicants' undersigned attorney.

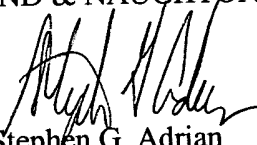
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In the event that this paper is not timely filed, applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees which may be due with respect to this paper, may be charged to Deposit Account No. 01-2340.

Respectfully submitted,

**ARMSTRONG, WESTERMAN, HATTORI,  
McLELAND & NAUGHTON, LLP**



Stephen G. Adrian  
Attorney for Applicants  
Reg. No. 32,878

Atty. Docket No.991493  
1725 K Street, N.W., Suite 1000  
Washington, DC 20006  
Tel: (202) 659-2930  
Fax: (202) 887-0357  
SGA/sdj

Attachments: **VERSION WITH MARKINGS TO SHOW CHANGES MADE**  
**Petition for Extension of Time**

VERSION WITH MARKINGS TO SHOW CHANGES MADE  
U.S. Serial No. 09/473,988

IN THE CLAIMS:

Claims 1 and 8 have been amended as follows:

1. (Twice Amended) A semiconductor device comprising an insulating interlayer formed on a conductive film and including a first insulating layer of a composition containing [SiN] SiH, and a second insulating layer formed on said first insulating layer,

wherein said first insulating layer has an H content of not less than 15.4 atom% in the composition, and has been formed to cover said conductive film with a third insulating layer being interposed therebetween.

8. (Twice Amended) A semiconductor device comprising a semiconductor element formed on a semiconductor substrate, and a multilayer interconnection structure formed over said semiconductor element and electrically connected to said semiconductor element,

wherein said multilayered interconnection structure is an interconnection structure of at least two layers in which a conductive film or a lower interconnection layer and an upper interconnection layer formed on an insulating interlayer are electrically connected through a contact hole formed in said insulating interlayer,

said insulating interlayer includes a first insulating layer of a composition containing SiH, and a second insulating layer formed on said first insulating layer, and

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said first insulating layer has an H content of not less than 15.4 atom% in the composition, and has been formed to cover said conductive film or the lower interconnection layer with a third insulating layer being interposed therebetween.